Issue 44

June 2022

Utah Valley Amateur Radio Club

# The UVARC Shack

# Springing into a summer of activities

As the weather begins to warm up, we look forward to another summer of ham radio activity. And summer means Field Day. This year, we as a club will set up shop at a slightly different location, still near Strawberry Reservoir.

Dusting off their rigs, tuning up, and looking forward to Field Day include (clockwise from upper-left) Doug Bosen W7GPD, Steve Walters KJ7BES, Shawn Hatfield KJ7SNE, and Jim Cooper W7KLA.

## In this issue of the *UVARC Shack*

Club meetings feature emergency services and Heinrich Hertz.

*Silent Key* for N9EJS and K7HFV. *My Shack* spotlights N7EKF. *Amateurs in Action* in the Himalayas. *Brass Tacks* on transformers.

*Dear Annette* answers why there are a lot more male than female hams, and another on the velocity factor of insulated wire. *Hot Tips* on wire gauges. *DIY* for a 160-meter pennant antenna. *The Amateur in You* on how to ham in an HOA, and your Baofeng HT.

*Please send your ideas, stories, questions, gripes, and photos to* ***uvarcshack@gmail.com***

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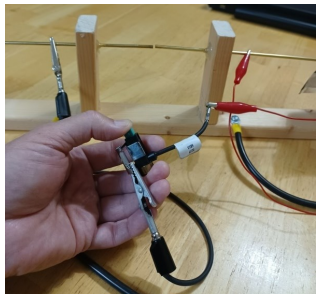
# Club meetings

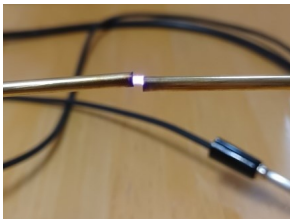
## *Recap*

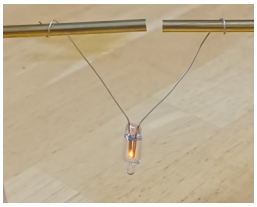
## April 2022 club meeting – A trio of service

A representative of each of three local services that use ham radio provided insight to his organization in our April meeting. Jeremy Stallard KE7DLT talked to us about UCARES (Utah County Amateur Radio Emergency Service) and what role they play in training volunteers to assist the Sheriff's Office in communication efforts when called upon. Mike Sawyer KC7MMM explained how CERT (Community Emergency Response Team) works and how they teach citizens to be more self-reliant during an incident. Steve Fleischer K7WON told us about TERT (Timpanogos Emergency Response Team) and explained how they use amateur radio to relay and coordinate help for hikers on Mt. Timpanogos during summer months. You can see the recording of the meeting here.

## May 2022 club meeting – Hertz's Experiment







Our club president Noji Ratzlaff KNØJI gave us a fun little presentation on the very beginnings of radio. He explained some o the history behind the search for the mysterious waves predicted by James Clerk Maxwell, and how Heinrich Hertz was the first to demonstrate their existence. Then, he set up the same demonstration at the meeting for us to see and hear (the sparks). You can see the recording of the meeting here.

*By the way, many of our past meetings are recorded and posted on the club YouTube channel.*

# Silent Key

## *Memorial for a ham who has passed on*

### George Nixon, N9EJS

Another long-time ham champion, George Nixon N9EJS, has left this world after 92 years. He was a friend to many of us in Utah County, sharing stories and laughter with whomever he came into contact. Even after moving to the Chicago area due to aging health, George continued to check in to our area every so often via EchoLink, just to stay in contact with his Utah ham community.

George was an active member of several amateur radio groups, including the W9ANL Night Patrol, the Night Crawlers Net, the 76ers, and UVARC.

George taught himself how to Morse code telegraph, then spent 47 years in the railroad industry as a telegraph operator train dispatcher. He also met his wife Ruby in 1950 through railroading friends, who also happened to be Ruby's brothers. He eventually became quite the accomplished CWer in ham radio, and later served as Vice President of the International Morse Telegraph Club until 2013.

Here are some paraphrased excerpts from George's obituary:

During World War II, George grew fond of railroading by ditching junior high PE and hanging out with the older dispatchers. Not only was he an accomplished dispatcher in the American Train Dispatcher union, but George also became the Director of Research of the organization. In the railroad industry, George helped provide expert information on many cases, even a couple that went to the US Supreme Court.

Being a committed man of God, George joined the Knights of Columbus and even became a Eucharist Minister with the St. Domitilla Church in Hillside, Illinois. George's interests were railroading, ham radio, and big band music. He and his family moved many times, largely because of the railroad industry, across Illinois, Texas, Indiana, and Utah, but mostly Illinois. George will be missed by the many who have kept in contact with him over the years.

When news of George's passing was announced, notes and comments started pouring in on social media, from people who remarked that George was one of the nicest guys on the air, that George always had something nice to say about people, that one could almost feel George's smile come through the speaker. When his daughter Mary and her husband Scott decided to start studying for their General licenses, George attended every class with them through a sheer show of support, even though he's already a General licensee.

His tireless attempts to remember call signs of the newest hams, and his child-like, high-pitched laugh will be missed for years to come.

73, George, and rest in peace.

*George is the father of Mary Turton KC9APG, who was one of the original UVARC founders, now living in Gunnison, Utah.*

# Silent Key

## *Memorial for a ham who has passed on*

### Gordon Smith, K7HFV

A local well-known legend, Gordon Smith K7HFV departed this frail existence on 21 April 2022, leaving behind students, elmers, and numerous friends. Annually, Gordon was the kingpin CW operator at UARC's Field Day, scoring more points than probably anybody else in the state.

Gordon was licensed in 1958 at age 14. Phil Bullock K7PB said, *I met Gordon at a UARC club meeting right after he became a ham. I was a teenager living in Provo at that time. We have been close friends for more than 50 years.*

When Gordon was a young lad, he came upon an old shortwave receiver, and listened to some of the local amateur radio conversations, which were often in AM. At one point, he heard one ham announce his phone number. Gordon called the man (possibly Dee Christensen W7YPC), who helped Gordon get a start on his amateur radio journey.

Gordon has since served the ham radio community in many ways over the years, by helping with the construction and maintenance of UARC repeaters, designing and building circuits that have withstood harsh mountaintop environments, was the chief editor of the monthly *Microvolt* newsletter, and was in charge of the club's VE (volunteer examiner) program. He was known and recognized as a fountain of knowledge and a voice of reason on the Utah airwaves.

When Gordon was eight, he learned the piano, and by eleven, was playing the organ. In 1971 he became the organist for the Mount Tabor Lutheran Church in Salt Lake City, and held that position until just a couple of weeks prior to his passing, nearly 51 years. You can see a recording of him demonstrating and playing the organ here.

*LtoR, Brett N7KG, Tom W7ETR, Ron K7RJ, Gordon*

Another of Gordon's favorite activities was hiking with his friends, especially if it accompanied a purpose. While hiking and backpacking in Canyonlands National Park or near Swasey Peak, he couldn't resist pulling out his radio or helping Clint with his latest optical project. Gordon also joined with friends to hike nearby canyons on Wednesday nights for short elevation hikes. Even though battles with cancer in his final three years slowed him, Gordon kept up until September 2020.

# Silent Key

## *Gordon Smith, K7HFV*

Gordon grew up with a rare physical issue known as Klinefelter Syndrome, which left him with one leg about 1-3/4 inches taller than the other, contributing to poor motor skills, and making Junior High life rather miserable. *Junior High was somewhat brutal. By ninth grade I couldn't walk down the hall without getting taunted. I never told my parents about that.* His father died around that time from a brain tumor, and Gordon went to live with his grandmother, who acted, for all intents, as his mother.

Once out of Junior High, Gordon's social life improved, but his remaining concerns included poor 3-D comprehension (he said, *Thank goodness electronic circuits can always be drawn in two dimensions!*), lack of interest in sports and competition in general, and was never attracted to hunting or fishing. He said he also never had much luck with the ladies; *I can't tell them about my sons that are becoming lawyers, and daughters becoming college professors. :-)* and so he never dated or married. As far as family, Gordon has no siblings, but two first cousins, and one of them *grew up in San Francisco and became a research scientist in Oceanography. The last I heard he was working in southeast Asia.*

***At Venus' 90th***

*I still live in the house where I grew up! I think most people look at life as a way to climb a ladder to ever greater success. Looking back, I think my plan has been more nearly 'find a comfortable place and stay there.'*

Gordon said he never had much connection with "the U," although he did go to school there for about seven years, and never graduated. He said, *I was having too much fun at my (by that time) full-time job.*

On 13 April 2022, Gordon was presented with an ARRL Utah Section lifetime achievement award, now named in his honor. You can read a tribute to Gordon on the UARC website.

73, Gordon, you'll be greatly missed.

# My Shack

***Highlighting the shack (ham equipment and room) of a member, to give others an idea of the possibilities that might work for them***

## Kent Flowers, N7EKF

In the mid-60s while working in the BYU broadcast lab, Kent heard co-workers get on ham radio calling ***CQ, CQ*** and contacting others, and thought that was pretty cool. But he never could focus on the [Morse] code well enough to pass the exam. By the end of the decade, Kent put all of that on hold to serve full-time in the Northwestern States Mission for the Church of Jesus Christ of Latter-day Saints.

While growing up in Salt Lake City, Kent said he got involved in broadcasting because he was lousy at sports, and wanted to find something cool in which he could stand out. In high school, he started announcing play-by-plays for basketball games. After that, he was hooked.

In 1972, right after his mission, Kent went to work at KSL. Later, he and Bob Welti shared a Mooney M20F airplane that they worked on. Kent taught Danny Kramer how to run the KSL control room. Kent was also an audio mixing technician for the Mormon Tabernacle Choir for several years. He also staged the telephone line transmission for the Priesthood Session of General Conference a number of years. Marriage and family eventually required Kent to become serious about a career, so he went to work at Allen's Camera, then managed Losee Jewelers for many years.

Kent's daughter told him about a ham radio class being offered in Orem, but he was hesitant, remembering that ham radio was very expensive to get into. He had a lot of interest because he wanted a reliable way to contact his daughter in Texas, if he ever really needed to. A neighbor Larry Driskill KE7AU gave Kent a small radio that costs about $30, which changed everything. So, he enrolled in the course, and that was the start of his ham adventure.

***Kent's go-kit with TYT TH-7800, et al***

Among his other gear, Kent owns an Icom IC-7300, IC-9700, IC-2730A, Elecraft KPA500, Xiegu G90S, Yaesu FT-60R, and Baofeng UV-5R. On the roof, Kent has a Butternut HF6V, S&K J-pole, and a DIY OCFD (off-center-fed dipole) antenna.

Since he's been licensed, Kent has run the New Ham Net, has participated in Field Day, and has taught several classes at Ham Radio University. If you call out your own call sign on the Intertie, you just might hear Kent reply with his friendly, familiar voice.

*— 73 from N7EKF*

# Amateurs in Action

***Recounts of ham radio operators who have used their time and skills to help others in a time of need***

## Earthquake in Nepal

Just before noon local time on Saturday 25 April 2015, a magnitude 7.8 earthquake struck Nepal, epicentered about 80 km to the northwest of the nation's capital Kathmandu. It was the largest earthquake in Nepal since 1934, and the deadliest day ever in Mount Everest history, killing 22 in a triggered avalanche. *Hundred of thousands of Nepalese were rendered homeless, with entire villages flattened*. Many centuries-old buildings, including some historically important sites, were damaged or destroyed.

Manju Sunar was living and working in France when she heard the news. Her daughter was back home in Nepal, and Manju wanted to know whether she was safe, but the cell sites, as well as power, were down in much of her daughter's part of the country. Having heard of the power of ham radio, Manju located the local amateur radio group where she was working, and they were able to contact a hobbyist-turned-survivalist in Nepal. After a search by motorbike, the report was relayed back that Manju's daughter was safe.

***Laxmi Khanal on foot, coordinating victim searches by ham radio HT***

In the town of Barpak, over the very epicenter of the quake, Ravindra Mul set up a transceiver and battery in a tent, then strung up a dipole in the trees above him. Once going, he was able to relay questions and information. In an impoverished nation like Nepal, most could not afford the equipment required to service a desperate population during such a large disaster, but it was all they had.

***Satish Kharel relaying much-needed survivor and other incident information***

Very few were aware that well-known attorney Satish Kharel of Kathmandu also hobbied on the side as an amateur radio operator for over two decades. His station allowed him to relay or answer anxious questions about conditions and numbers for families, survivors, and victims. When the power was cut, Satish ran out and connected his equipment to his car battery, and jumped right back on the air.

You can read more details of how ham radio operators helped during the Nepali earthquake in *Nepali Times* and in *Ars Technica*.

# New Hams and Upgrades

## New hams

KK7EUH = Gregg Christensen
KK7EWG = David Bailey
KK7FEE = Daniel Anderson
KK7FEG = Joel Buss
KK7FEI = Michael Corey
KK7FEK = Sophie Garaix
KK7FEL = Kyle Harris
KK7FEN = Matt Heffelfinger
KK7FEO = Kelsey Hiatt
KK7FET = Ray Lewis
K8ZLY = Lynnette Perkins
KK7FEZ = Aaron Postak
KK7FFA = Adam Roberts
KK7FFB = Jed Roberts
KK7FFC = Shane Romrell
N7SLS = Sandi Steiner
KK7FFG = Tami Varner
KK7FFI = Virginia Weekley
KK7FFJ = Teresa Whitlock
KK7FFK = Blaine Wood
KK7FIQ = Mark Philbrick
KK7FIR = Peggy Philbrick
KK7FOD = Daniel Joseph
KK7FOE = Samuel Joseph
KK7FON = Matt Anderson
KK7FOQ = Anthony Earl
KK7FOR = Micah Eastwood
KK7FOS = Max Gandy
AI7MQ = Mark Gheen
KK7FOT = Renae Gheen
KK7FOU = Rodney Gustafson
KK7FPB = Loretta Moshier
KK7FPE = Peter Ransom
KD6NOH = Richard Rosevear
KK7FPH = David Rubow
KK7FPI = John Shepherd
KS5SUL = Kevin Sullivan
KK7FPK = Fuifui Taotua
KK7FRN = Barret Cann
K1ICY = Logan Holman
KK7FTY = Megan Myers
KK7FXG = Dustin Chadwick
KK7GFS = Robert Hartung
KK7GFT = James Glenn
KK7GFU = Evan Hicken
KK7GGH = Derrick Laub
KK7GGX = Robert Aldous
KK7GHX = Klover Glazier
KK7GIT = Robert Williams
KK7GKB = Sean Lavering

## Upgraded hams

KE3YOR = Laura Wigington (General)
KG7RJ = Ryan Johnson (Extra)
KJ7UVZ = Jessica Johnson (Extra)
KJ1DAD = Keith Castleton (General)
KJ7BWB = Riley Johnson (Extra)
KK7BJW = Jennifer Ray (General)
KD7AKS = Don Ostler (General)
KG7RPI = Kenneth Goepfert (General)
KI7EYK = Tyler Hulsey (General)
KI7SHU = Taylor Foote (General)
KM7MLB = Michael Buck (Extra)
KJ7RXF = Val Cook (General)
KG7VWS = Carlos Reina (General)
KJ7STI = Adam Hall (General)
N6TAG = Marsden Haws (Extra)

**Congratulations to all these diligent folks! We look forward to hearing you on the radio soon.**

# Events

*Upcoming happenings*

## Summer Field Day

Our location this year will be a little different from that of past years, in that, instead of parking in the usual loop we normally use up Co-Op Creek, we plan to be stationed up Trout Creek, about 3 miles to the southeast of last year's location, at an open location.

For Field Day, we'll need the usual help for setting up and taking down, but we'll also need help towing up the port-a-potties, the communication trailer, and the UVARC trailer.

Or our Saturday potluck, the club will provide sloppy joes! We'll also provide the paper products and utensils, but we're hoping you'll bring something to go with it, like a dessert, a drink, a dessert, salad, dessert, side dish, or even dessert. This is a family-friendly event, so bring the whole gang, and make it an overnighter. A sign-up will be posted soon.

## 76ers Annual Barbecue

Lynn Hancock K7LSH and Carl Pockrus WE7OMG have once again secured the pavilion at Highland Glen Park for our annual barbecue, this year on Saturday June 4, from 10 am to 3 pm.

If all goes as planned, we'll have a fox hunt, an HF station set up for you to get on the air, and a door prize drawing. If you'd like to contribute toward the food or door prizes, please alert Carl or Jeremy Giovannoni K7TEH.

## The Ugly Antenna Contest and Ham Radio Fair

Our first-ever *Ugly Antenna Contest* this coming July is full steam ahead. Anybody can enter an antenna into the contest, but the owner must demonstrate that it can be used to transmit farther than a city block on an amateur frequency. We'll have judges who'll decide which working antenna is the ugliest. The top three will win prizes, but first place wins a used HF radio.

We're holding it in connection with our second annual *Ham Radio Fair*, both at 6:00 pm on Thursday 14 July 2022, at the Lindon Community Center, 25 N Main St. Families, friends, friends of your family, are welcome to check out the stuff, the stations, and the fun of amateur geek.

## UVARC Swap Meet

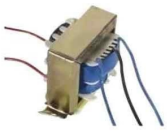
Heads up! The Utah Valley Swap Meet this year will be 9:00 am Saturday September 24, at the Spanish Fork North Park Pavilion, 1185 N 400 E. One of our few fund-raisers ever, entrance is $5 per person or $10 per family, plus $10 per table to display your wares.

Dave Becar KI6OSS said that he might be holding an exam session just outside the pavilion, under the Laurel VEC for the first time. We'll post info on that, as time progresses.

# Brass Tacks

***An in-depth look at a radio-related topic***

## Transformers



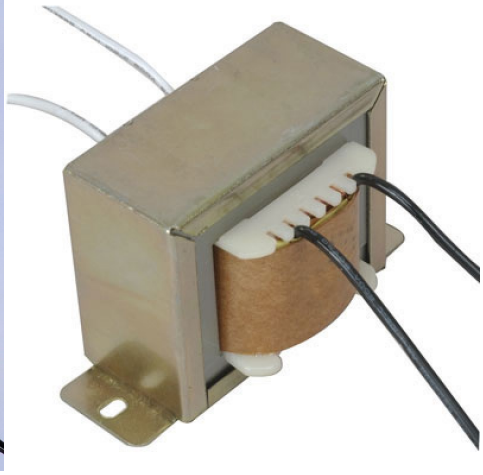
In 1831, Michael Faraday (and independently in 1832, Joseph Henry) showed that *a changing magnetic field can induce a voltage in a nearby conductor*, today known as Faraday's Law. No pun intended, this relationship transformed the electrical world, leading to the invention of the electric motor, the electric generator, and yes, the electrical transformer. Needless to say, these devices have advanced enormous changes in manufacturing, and have played a major role in the transition between the First and the Second Industrial Revolution.

Transformers can be very large, weighing tons, to handle large voltages and currents, or very small, to be installed on circuit boards. There are also very unusual transformers for unique applications, but this discussion focuses on the types that are most commonly seen or used by radio amateurs.

Let's take a closer look at the construction of a transformer, and examine the science that goes into its function. This will help us understand better how transformers apply to us common folk, and why it might be helpful to know how they work.

### Transformer fundamentals

A transformer is a passive electrical device that transfers electrical energy from one circuit to another or multiple circuits. There are many different kinds of transformers, and most of them use the same principles to achieve their magic. So, what exactly do transformers *transform*? In the world of amateur radio, we typically see two applications: transformation of voltages and transformation of impedances. But if you stop and think about the math (and we will), you can see that those are pretty much the same thing.

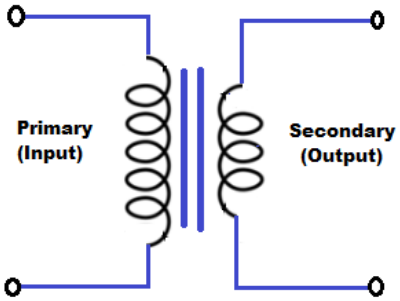


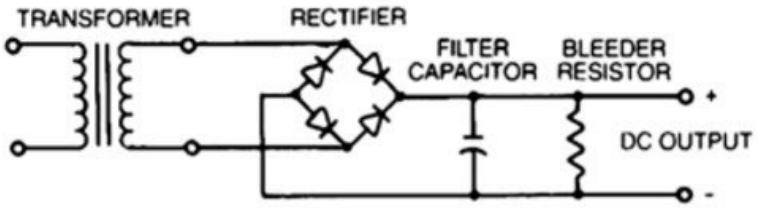
A transformer is nothing more than two or more *inductors* working together to transfer electrical energy between circuits. Here are a couple of transformer photos, the one on the left is that of a neighborhood (residential) transformer, which converts a high voltage coming from the power company, to house voltage. The one on the right shows a common power supply transformer that might be found in an appliance, a doorbell, a charger, or furnace.

# Brass Tacks

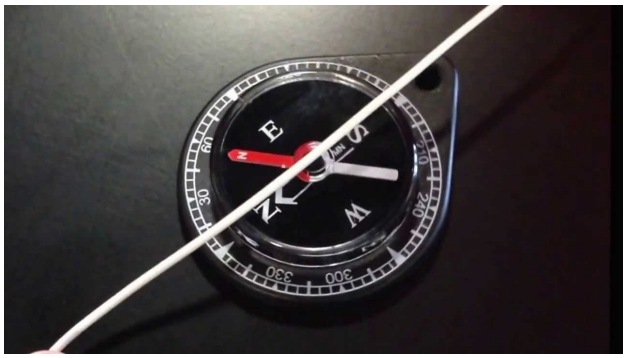
## *continued*

The following are two circuit schematics, the one on the left is for a transformer symbol alone, while the one on the right uses the symbol in a simple, unregulated power supply circuit:




From the transformer symbol, you can see by the two coils of wire that this one represents two inductors closely associated with each other. The lines in between the coils represent a transformer ***core***, whose material (metal, air, space, etc.) might depend on the transformer type.



You might recall that a magnetic needle compass works by pointing in the direction of Earth's magnetic field. If you send a current through a wire, it creates a magnetic field around the wire, and the influence of the magnetic field can be shown by bringing the wire next to the compass when you close the switch to complete the circuit with a battery, deflecting the compass needle. This is known as Oersted's Experiment.

Now, suppose you removed the compass, but placed a second wire next to the first one, the one you're sending current through. If you were to measure the voltage across the second wire, you would see zero volts, except when you closed and opened the switch. At the moments when your voltmeter jumps away from zero, the current in the first wire caused a voltage to appear in the second wire by means of the magnetic field, an effect called ***mutual inductance***. What this also tells you is that the current in one wire can't cause a voltage change in the next wire unless ***the current changed***.

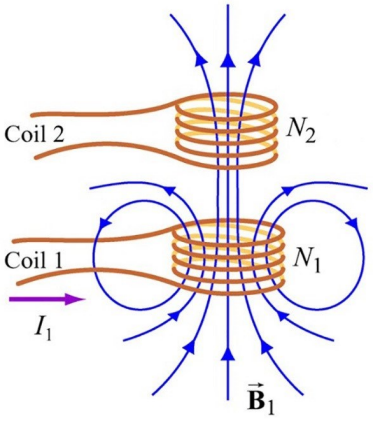
If you were to coil the first wire in a small loop, the strength of the magnetic field created by the current in the first wire would be increased. In fact, the magnetic field strength will be multiplied by ***the number of turns in your coil***. That means the voltage jumps ***induced*** in the adjacent wire will also increase in magnitude. Furthermore, if you were to coil the second wire, as well as the first, the voltage jump across the second wire would be more pronounced.

As mentioned, the second wire only exhibits voltage when the current in the first wire changes. Suppose we make that first-wire current change constantly, like what happens with AC (alternating current). In that case, the constantly changing current in the first wire produces a constantly changing magnetic field, which then results in a constantly changing voltage in the second wire. This two-wire, mutually coupled setup is known as a ***transformer***.

# Brass Tacks

## *continued*

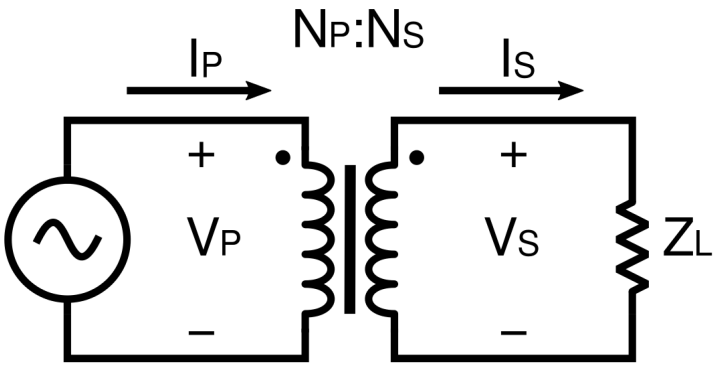
### Do the math




It should be apparent that there's a mathematical relationship between the two sides of a transformer. The most foundational relationship is that ***the electrical power entering a transformer equals the electrical power exiting it***. This means that, while other properties might vary from one side of a transformer to the other, the quantity of power will be equal on both sides, simplifying many calculations.

This statement has one exception, and that is with regard to transformer ***losses***, exhibited largely as heat and flux leakage (the small part of the magnetic field that gets absorbed by something else.) Fortunately, transformer losses are quite small. But these losses are the reason that transformer efficiency is not fully 100%. For the purposes of this article, however, we will assume that transformers are ***ideal*** (and actually be very close to the truth in most low-frequency cases.)

Let's return to the original "circuit" we discussed, with a coil on one side and a coil on the other side, in close proximity with each other. Let's call the first wire the ***primary*** side of the transformer, and the second wire the ***secondary*** side. In this case, when we apply an AC voltage source to the primary side, we can call that $\mathbf{V_P}$, and its current $\mathbf{I_P}$. Therefore, the secondary side will have a $\mathbf{V_S}$ and $\mathbf{I_S}$, respectively, across a load impedance $\mathbf{Z_L}$. In addition, the number of coil turns on each side is $\mathbf{N_P}$ and $\mathbf{N_S}$, respectively. Again assuming that our transformer is ideal, we can disregard the losses for now. So, because of the conservation of energy,




$$\mathbf{P_{OUT} = P_{IN}}$$

$$\mathbf{P_{SECONDARY} = P_{PRIMARY}} \text{ or } \mathbf{P_S = P_P}$$

Since power is calculated $\mathbf{P = V \times I}$,

$$\mathbf{V_S I_S = V_P I_P}$$

Remember from our little experiment that the voltage across the secondary increased when we added more coil turns to it. In fact, the number of coil turns is proportional to the voltage on each side, meaning if our transformer has twice as many coil turns on the primary as it does on its secondary, then the voltage across the primary will be twice that of the secondary, because of the ***turns ratio***:

$\mathbf{N_P:N_S}$, or $\mathbf{V_P/V_S = N_P/N_S}$

And because $\mathbf{P = V \times I}$, the current is just the inverse, or $\mathbf{N_P/N_S = I_S/I_P = V_P/V_S}$

# Brass Tacks

***continued***

## For example

Say we have a transformer that has 500 turns for its primary winding and 250 turns for its secondary winding, tightly wrapped around an iron core. Say also that the primary side is plugged into the wall socket, while the secondary is attached across a 10-ohm light bulb, which is the load. What would be the resulting currents and voltages on both sides? We can assume that the wall socket voltage units is ***volts AC*** (alternating current) ***RMS*** (root-mean-square).

$V_P = 120$ VAC, but we also know that $V_P/V_S = N_P/N_S$, so

$V_S = V_P \times (N_S \div N_P) = (120 \text{ VAC}) \times (250 \text{ turns} \div 500 \text{ turns}) = 60 \text{ VAC}$

$I_S = V_S \div Z_L = (60 \text{ VAC}) \div (10 \text{ ohms}) = 6 \text{ amps}$

$P_S = V_S \times I_S = (60 \text{ VAC}) \times (6 \text{ amps}) = 360 \text{ watts}$

$P_P = P_S = 360 \text{ watts}$

$I_P = P_P \div V_P = (360 \text{ watts}) \div (120 \text{ VAC}) = 3 \text{ amps}$

As can be seen from the above example, the transformer is converting 120 volts into 60 volts, and yet it requires only half as much current from the wall socket that the load requires. This is why your power supply can deliver 30 amps to your HF rig, but won't trip your 20-amp circuit breaker when you transmit on full power; it's likely only drawing about 3.5 amps from your wall socket, because it's presenting a much lower voltage to your transceiver.

In this case, because the secondary voltage is lower than the primary voltage, we call this a ***step-down transformer***. One whose secondary voltage is higher than the primary voltage is known as a ***step-up transformer***. (In fact, many transformers can be used to perform either function.) For our power grid, the voltages at the power plant are stepped way up (often to hundreds of kilovolts), sent across the country, then stepped back down to safer and usable levels locally.

The higher voltage in our electrical transmission lines allows for lower current to be transferred through the long, resistive wires, reducing energy lost as heat, known as ***$I^2R$ loss***. This arises from the equations $P = V \times I$ and $V = I \times R$, making $P = (I \times R) \times I = I \times I \times R = I^2R$.

## Transforming impedances

When you set your transceiver output power to a specific level, typically your intention is to send as much of that power as possible through your antenna and into the air. The most amount of that power that you can transfer from your radio and through your antenna is known as maximum power transfer, and can only occur if your transceiver output impedance matches that of your antenna system.

One purpose of tuners is to achieve that match, but it can also be accomplished using a transformer, which can be used to transfer electrical energy between two circuits of different impedances. When used this way, we say it's ***matching*** the two impedances, meaning it presents an impedance on the primary side, matching that of the input circuit, and another impedance on the secondary side, matching that of the circuit connected to the output.

# Brass Tacks

## *continued*

Many hams have enjoyed the effectiveness of using a *long wire* or *random wire* antenna, which is often employed in an *end-fed* configuration. But such a wire typically presents an impedance of 1800 ohms to 5000 ohms, depending on the band of interest, and does not allow for maximum power transfer from a 50-ohm transceiver. The goal, then, is to design a transformer with a primary impedance of 50 ohms, and a secondary impedance of between 1800 ohms and 5000 ohms.

The transformer calculation will involve determining the number of required winding turns on each side, to match the impedances on both sides, since the voltages and currents are not only unknown, but unnecessary. We start by relating the numbers of turns to impedances:

$$Z_S / Z_P = [(V_S/I_S) / (V_P/I_P)] = (V_S \times I_P) / (V_P \times I_S)$$

$$V_S = V_P \times (N_S / N_P) \text{ and } I_P = I_S \times (N_S / N_P)$$

$$Z_S / Z_P = \{[V_P \times (N_S / N_P)] \times [I_S \times (N_S / N_P)]\} / (V_P \times I_S)$$

$$Z_S / Z_P = N_S^2 / N_P^2 = (N_S / N_P)^2$$

This means the impedances relate to each other by *the square of the turns ratio*. In the case of the long wire, the square of the turns ratio is

**5000 ohms / 50 ohms = 100** and **1800 ohms / 50 ohms = 36**

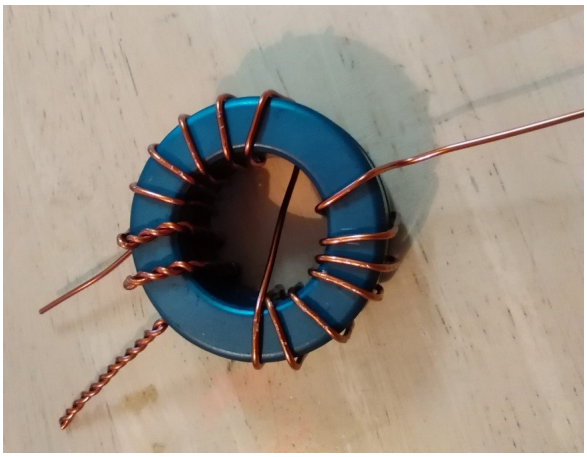
For convenience, let's select a perfect square between those values, such as 64 or 49. Selecting 49, for example, will result in standing wave ratios of

**1800 ohms / 49 = 37 ohms** and **5000 ohms / 49 = 102 ohms**

**50 ohms / 37 ohms = 1.35:1 SWR** and **102 ohms / 50 = 2.04:1 SWR**

both well within internal tuner (maximum 3.0:1 SWR) range. The required number of transformer windings are then

$\sqrt{(Z_S / Z_P)} = \sqrt{(49:1)} = 7:1$ and then wind it with 14 turns on one side and 2 turns on the other (same 7:1 ratio) to improve mutual inductance while keeping ohmic losses low (another topic for another day.) The photo to the right shows the resulting transformer prior to being attached to an enclosure.



In this RF (radio frequency) transformer, 14 turns of the wire are wrapped around the toroidal core, with seven on one side and seven on the other side, to evenly spread the magnetic field flux into the ferrite material. The 2 turns are *bifilar*, or intertwined with two of the 14, then the two share a common feed point from the antenna center conductor.

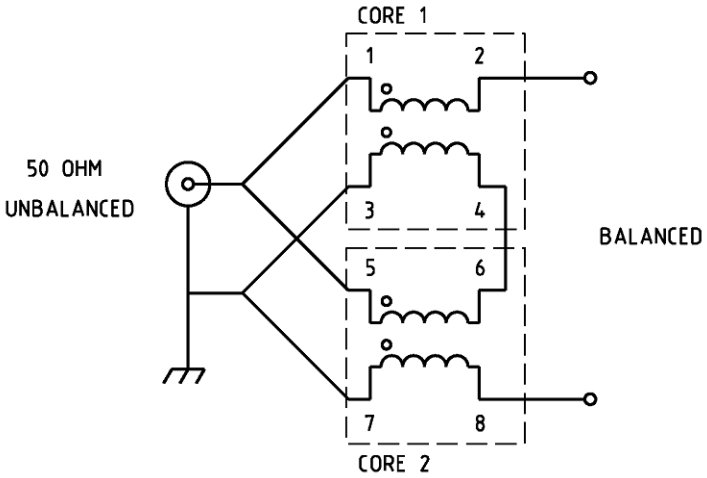
# Brass Tacks

## *continued*

### Balun transformers

A discussion about using transformers for antenna impedance-matching isn't complete without mentioning the difference between an *autotransformer* and an *isolation transformer*, both of which apply to different antenna types. An autotransformer is often made from a single winding instead of a pair of windings, or can be constructed by sharing a common winding between input, output, and ground. An isolation transformer typically contains two separate windings, to electrically (and often physically) separate the primary and secondary circuits.

A special case of an isolation transformer is the Guanella current balun (schematic to the right), often used for end-fed, long wire, and OCFD (off-center-fed dipole) antennas, which require an impedance transformation between a balanced (dipole) antenna and an unbalanced (coax) feed line. A Guanella current balun also employs two separate windings, but they share a center tap connected to ground separate from the output. The result is an *ungrounded balanced output*, which reduces common-mode current that can result in shack RF or common-mode noise.




### Finally

One thing we did not investigate in this discussion is the concept of phase angle, which was omitted for simplicity. The fact is, the actual relationship is

$$P_P = P_S = V_P I_P \cos\varphi_P = V_S I_S \cos\varphi_S$$

in which **φ** is the phase angle between the voltage and current, taking into account the ***power factor*** through a transformer. In this case, **P** is the real power, while **V** and **I** are RMS values.

Another is transformer losses. As mentioned, most of our calculations are based upon an idealized transformer, but we're forced to consider these losses as they become more pronounced with an increase of AC frequency or an increase in power. And when used in amateur radio applications, those losses due to higher frequencies can become significant.

### Summary

A transformer is a device that converts the voltages between two or more powered circuits. Many real-world transformers are nearly lossless, meaning that nearly all of its output electrical power is equal to its input electrical power. From that approximation, we can calculate the electrical parameters of a transformer quite easily. A transformer is also used to match impedances between two circuits of different impedances, to promote maximum power transfer.

*Noji Ratzlaff, KNØJI (kn0ji@arrl.net)*

# Dear Annette

***What's on your mind? Serious, humorous, technical, and thoughtful answers to your deepest, (mostly) ham-related questions.***

Dear Annette:

A couple of weeks ago, I noticed while listening on a net, that the Net Control guy asked one of the people who checked in for comments. The commenter announced his call sign, talked for a few seconds, then turned it back over to Net Control, but never gave his call sign when he was through. In fact, another guy did the same thing a few minutes later. Not really meaning to judge the two, but aren't we supposed to give our call signs at the end? What am I missing?

Curious in Orem

Dear Curious:

On one hand, you're right: we are supposed to announce our call signs at the end of our communication. On the other hand, it sounds to me like the two you heard did just that: they announced their call signs at the end of their communication. The fact that each gave his call sign at the start of his transmission was enough to satisfy the rule, because it was also his final transmission, marking the end of the communication. And this is what makes contesting legal, since much of the time, the call sign is only given at the beginning, but counts as the end as well.

Dear Annette:

Is it true that insulated wire has a different velocity factor than bare wire?

Kyle in Orem

Dear Kyle:

The velocity factors of insulated and bare wires of the same type and gauge are indeed different, but not by much, and without some precision instruments, I doubt you'll ever notice that difference. So for all practical purposes, you're safe to consider them the same.

Dear Annette:

Why are there a lot more male hams than female hams?

Sam in Springville

Dear Sam:

It's true that amateur radio is, and has always been, dominated by male participants. Why one gender tends to gravitate toward one interest (vocation, hobby, activity) over another is a topic of much study. Some suggest that the reason is more cultural than genetic; in other words, the propensities, identities, and expectations might be placed on the activities by their societies, rather than by their chromosomes. Regardless of the reasons, STEM activities such as amateur radio in general *tends* to attract more males than it does females in the US today.

Dear Annette:

The rules state that a teacher can operate a ham radio for pay, as long as the operation is part of classroom instruction. Well, I would like to demonstrate ham radio in the classroom I teach in, but I work at a museum. Would my job count as a "teacher" there?

Ross in Provo

Dear Ross:

According to Part 97.113(a)(3)(iii), to qualify,

- You must hold a "teaching position"
- It must be "classroom instruction"
- It must be at an "educational institution"

If your operation during work hours fits those criteria, then you're well within the rules. And the interpretation is often quite loose.

*Got a question for* Dear Annette*? Email it to* ***uvarcshack@gmail.com*** *and include your town name. Sorry, no guarantees.*

# The Amateur in You, Part 1

***What have you been pondering?***

## You and the Baofeng

As I was stopped at a light in town one day, a vehicle badly in need of a muffler pulled up beside me in the next lane. It was a Lamborghini, and it looked new and very sporty. For a moment, I pictured myself in the driver's seat of that shiny car, until reality set in. I could never afford the taxes and maintenance cost of that sports car, let alone purchase one. Then again, after another reality check, I realized that the driver of that car was probably just going to the store, and my little car can get me to the store just as effectively.

Baofeng has produced what is probably the greatest amateur radio that has even been sold, the UV-5R. In my opinion, that single model has revolutionized the world of amateur radio by placing the modern technology of ham in the hands of the average licensee, due to its price point and features.

Sold for anywhere from $16 to $30, this little marvel can be purchased by the most modest of income earners. The UV-5R (and many other models) have these unique features:

- FM broadcast listening
- Flashlight
- Ability to transmit outside amateur bands (including FRS, GMRS, and MURS)
- Dual-band and dual-watch
- Can set separate transmit and receive CTCSS tones

In addition, most Baofeng models feature

- Easy manual programming
- Supported by CHIRP
- Loud, clear audio
- Transmitted audio is indistinguishable from that of more expensive brands
- Very durable / rugged outer shell
- Accessories can include an alkaline battery case for many models

It's true that many Baofeng radios are not manufactured by the high-quality standards that some others are, just like my little Nissan isn't as high-quality as a Lamborghini might be. But I can afford a pair of Baofeng radios, which work just as well as one of the others that costs four times the price.

Also, the fact that a Baofeng radio can transmit outside the amateur bands is a bit concerning to some long-time amateurs. They feel that new hams can't be trusted with such a device, because they might accidentally, or even deliberately, transmit on non-amateur frequencies, which is not legal with most Baofeng radios. Of course, my car is able to exceed the speed limit, so I wonder whether those same folks trust me to drive.

And yes, it's not legal to use a Baofeng to communicate on FRS, GMRS, or MURS frequencies, for example. But if my life truly depended on it, you can bet that those legalities will likely be the last thing on my mind.

Some people love to point out the fact that some Baofeng radios emit an illegal signal, which is true. If they took the effort to examine their own HT, they might be unpleasantly surprised to find that most HTs suffer from this issue. That's not to excuse the bad emission, because we should all adhere to the law the best we know how, like obeying the speed limit.

My purpose is to help you feel better about owning and using a Baofeng radio, whether or not you've been accosted by one of the vocal nay-sayers who love to put them down. Rest assured that you own a valuable and worthy piece of amateur radio history.

*Noji Ratzlaff, KNØJI (kn0ji@arrl.net)*

# The Amateur in You, Part 2

***What have you been pondering?***

## How to ham in an HOA

If you live in a house or apartment that's part of an HOA (homeowner association) or CID (common interest development), you might be aware of the great benefits it can provide for your home and property, such as maintenance and management services, communal security, recreational amenities, and insurance coverage. But these come with a price, and in the interest of amateur radio, sometimes by way of antenna restrictions due to rules regarding appearance.

Before moving into an HOA-governed home, you're usually required to sign a legally binding contract, in which you agree to abide by the rules of the CC&Ds (Covenants, Conditions, and Restrictions) specified in that contract. Because the agreement is binding, the HOA can legally fine you or even foreclose on your home if you violate the conditions of that agreement.

You might have found that the HOA rulebook is way too long to completely read through it before signing the agreement. As a result, you might not be aware of obscure limitations, such as the color of your mailbox, what kinds of dogs they allow, and whether antennas are permitted on your house exterior. To be sure, once you sign the agreement, you're bound by it, regardless whether any of it conflicts with another statute, even a federal one. So, you promise to abide by anything in the book regarding antennas.

Many have asked what kinds of effective antennas they can install to appease the HOA, in spite of these prohibitions. Still others wonder whether the HOA, a local body, has the legal jurisdiction to enact rules contrary to activities protected by the amateur radio service, a federal body.

If you decide to approach the HOA with your request to install an antenna, they're obligated to give you one answer, and it's likely spelled out in that rulebook, whether the representative you talk with is a friend or a ham or neither. They don't *want* to have to read you the riot act. So, one way to approach this dilemma is how many of them prefer it: 1) be reasonable about the type of antenna you want to mount and 2) just go ahead and install it anyway. Being ***reasonable*** typically means that your antenna should not be so large or unsightly that it disrupts the neighborhood beauty, and that it's fairly easy to install and remove if needed. So for now, no tower, no Yagi, and no hex beam.

Later, if the HOA asks you to remove your antenna, simply take it down, and all is forgiven. It typically takes more than one request or written warning before the HOA fines you for violating the agreement. Do not resist them or point out some obscure law they're unaware of, because if you fight them, you will lose. Be the good tenant and comply with their demands.

For those who would rather visit the dentist than face possible confrontation by sneaky neighbors or a suspicious HOA president, there are some compromise antenna setups that might allow you to operate on *some* bands without advertising that fact. One solution is a *flagpole antenna*, which allows you to mount your antenna on a flagpole mast, or make the mast your antenna itself. Another is the *HOA Buster*, made by connecting one side to your rain downspout and the other driven into your flower garden dirt. Yet another is running a wire, such as part of an *end-fed half-wave antenna*, across and a few inches over your roof by stand-offs. Another possibility is to install one in your attic, if it has the room, as long as your attic isn't surrounded by metal. And there are others.

# Hot Tips

***Good info for the new ham, and old stuff to refresh your memory***

## Which wire gauge to use

Whether we're building a project or replacing a damaged item, we often struggle deciding what gauge (size) of wire we need for the task. This is an abbreviated list of recommended wire gauges based on use and environment.

It might be apparent that, as the wire gauge numbers get larger, the wire sizes get smaller, a result of the original 1857 agreement known today as American Wire Gauge, or AWG. Here are my recommendations listed by usage, and please keep in mind that they *are* recommendations, unless otherwise stated:

### Antenna elements

An antenna element is simply a wire used for conducting RF (radio frequency) signals from your feed line (such as coaxial cable) to the air, such as on a dipole. The primary difference here is the length, based presumably on frequency; the longer the wire, the thicker it needs to be. Also, solid copper is more prone to stretching and breaking in the wind.

Under 15 MHz = **14 AWG** (stranded, insulated)

Over 15 MHz = **18 AWG** (stranded, insulated)

### Grounding

There are typically three locations to consider ground wiring, and each has a purpose that requires a different wire size.

From ground rod to mast = **4 AWG** or **6 AWG** (solid or stranded, insulated or bare)

From equipment to ground panel = **10 AWG** (stranded, insulated)

From ground rod to ground rod = **4 AWG** (solid and bare)

### DC power cables

Wires used for supplying power (voltage and current) between your power supply and a piece of equipment should follow the recommendations of the equipment. For supplying power to radios and amplifiers, I recommend

Under 6 A = **12 AWG** (stranded, insulated)

Over 6 A = **10 AWG** (stranded, insulated)

### Antenna radials

An antenna radial is a wire that serves as a ground balance (counterpoise) to the radiating element, and is either buried or elevated (over your roof).

Permanent = **14 AWG** (stranded, insulated)

Portable = **18 AWG** (stranded, insulated)

Tiger tail = **18 AWG** (stranded, insulated)

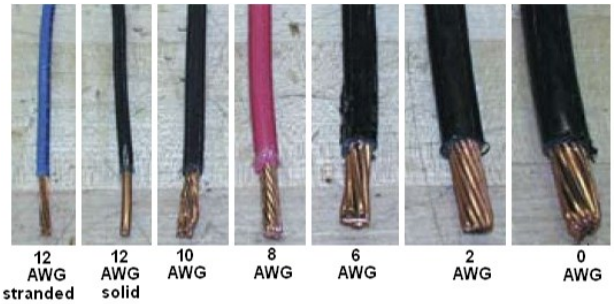
### Transformer windings

When I wind a *matching* transformer for a balun or unun, I typically use the following:

4:1 = **18 AWG** (stranded, insulated)

9:1 = **22 AWG** (solid, insulated)

49:1 = **14 AWG** (solid, enameled)



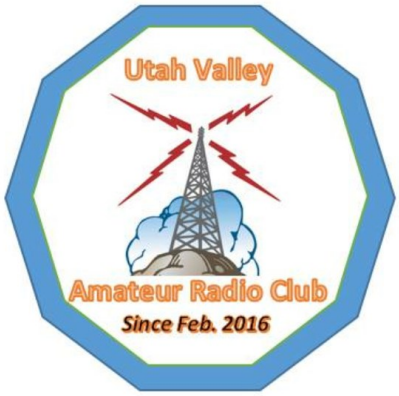

### Finally

This list is by no means comprehensive, but can get you going in many, if not most, amateur radio applications. Also, this reflects my own observations and my opinions, so your own experiences and needs might vary.

*Noji Ratzlaff, KNØJI (kn0ji@arrl.net)*

# DIY

***Worthwhile projects you can build on your own***




## 160-meter pennant antenna

In the aftermath of World War I, there was a large development effort in search of a way to listen to distant signals, in spite of all the surrounding noise. The Beverage antenna was a result of that development, but it was a very large antenna, some on the order of a half mile to three miles long. Many felt that a much smaller antenna could be made with the same or close receiving ability and SNR (signal-to-noise ratio), which the Beverage antenna was known for.

The ***pennant antenna*** was just such an antenna, which exhibited a similar SNR, only much smaller in size. Because the pennant antenna is primarily a receive antenna, the challenge here is whether we can modify the original design to work satisfactorily as a transmitting antenna as well. This model is patterned after the single-pennant versions by Gary Nichols KD9SV and Earl Cunningham K6SE.

### Parts list

75 feet of 14 AWG stranded insulated wire

One BN-73-202 "binocular" ferrite core

Two small pieces of hard plastic

Four 10-foot 1″ schedule 80 PVC

Nine 14 AWG #8 stud ring terminals

4 each M3 screws, split washers, nuts

One SO-239 bulkhead connector

40 inches of 30 AWG insulated wire

One 910-ohm 5W resistor

Two 36″ round stakes

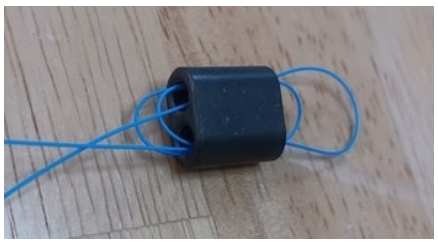
Six #8-32 screws, nuts, split washers

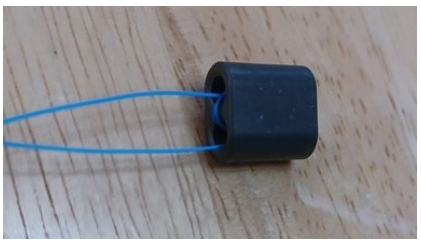
Hot glue and gun

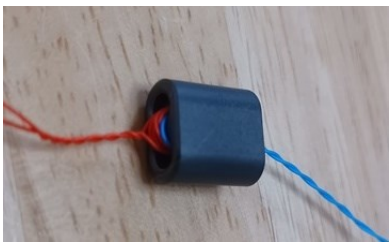
### Transformer and connector assembly

The pennant antenna is completely isolated electrically from ground, and so requires the construction of a 4:1 *isolation transformer*. This device keeps the feed line electrically separate from the rest of the antenna, and so must be wound with two separate wires, one pair connected to the coax and the other to the antenna elements.

Start by tightly winding ***three turns*** of the blue wire around the middle of the core, both ends of the wire protruding from different holes on the same end, then pull them tight. Next, tightly wind ***twelve turns*** of the red wire around the same core, but from the other end, again such that both ends of the red wire protrude from different holes on the same end, then pull them tight. Twisting the wires is not necessary; I only did it to keep them from loosening. Strip about ¼″ off all four wire ends.







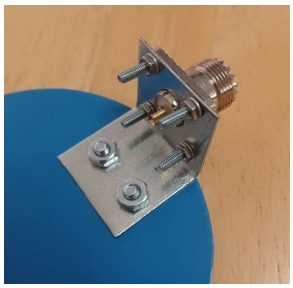
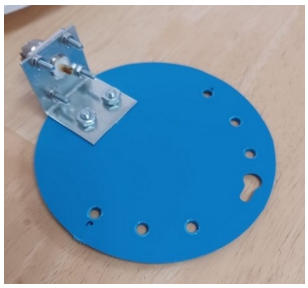
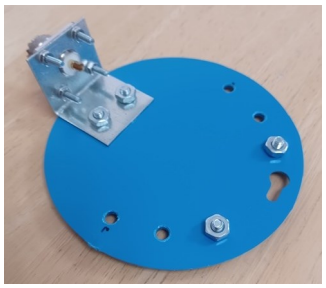
# DIY, continued

## *160-meter pennant antenna*

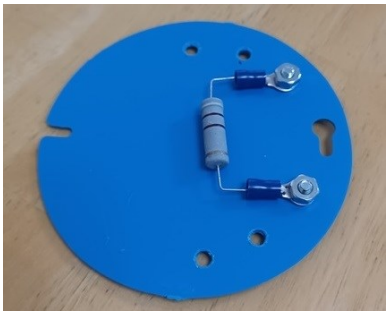


Install the SO-239 bulkhead onto a piece of scrap sheet metal strap (I actually purchased a vent hanger), about 1-¼″ wide, using a 7/16″ hole for the center. Drill out four 1/8″ mounting holes, deburr the holes, and install the bulkhead using the M3 screws, washers, and nuts to hold it in place. Bend the bulkhead part of the strap to lead the coax away from the antenna and to keep the coax shield as far from the transformer as possible.

Drill out two 3/16″ mounting holes in both the strap and one of the hard plastic pieces, then Install the strap onto the plastic piece by two #8 screws, nuts, and split washers. Drill out two more 3/16″ holes in the plastic piece, 90° away from the bulkhead connector and ½″ from the edge, then four more, each ¾″ apart and ½″ from the edge. Drill out the same pattern on the second plastic piece. Deburr all drilled-out holes to protect the wire elements. Install two #8 screws, nuts, and split washers in the holes closest together in each plastic piece.

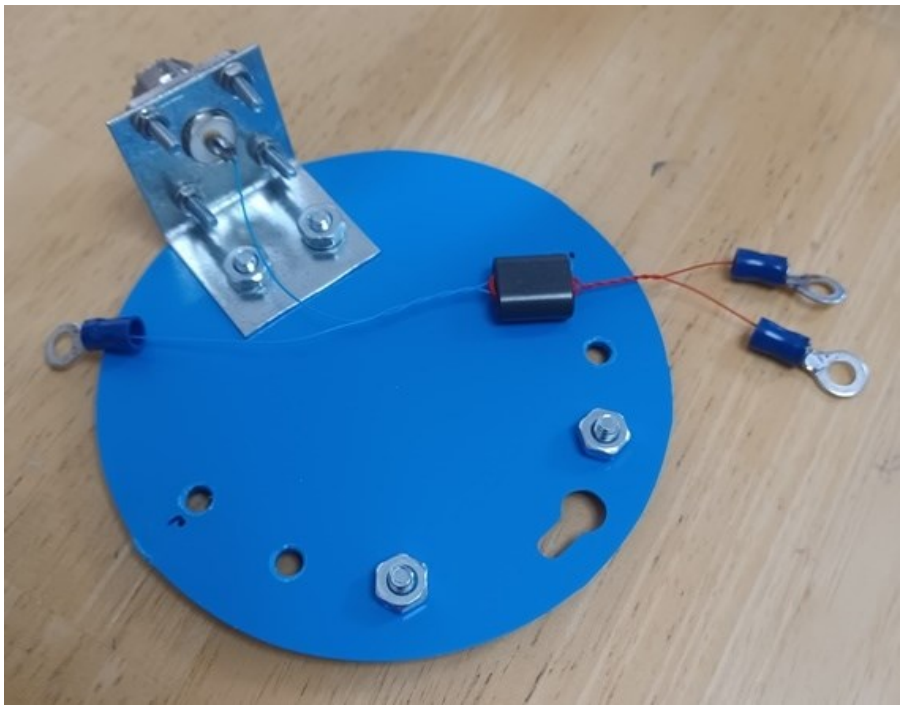
Solder the 910-ohm resistor to a pair of #8 ring terminals. Attach the resistor terminals to the two #8 screws on the second plastic piece.



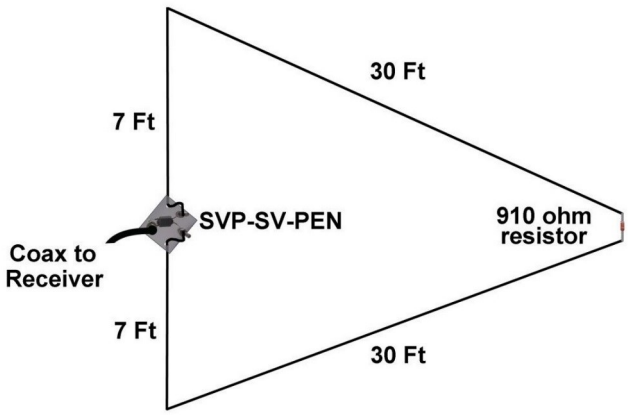
# DIY, continued

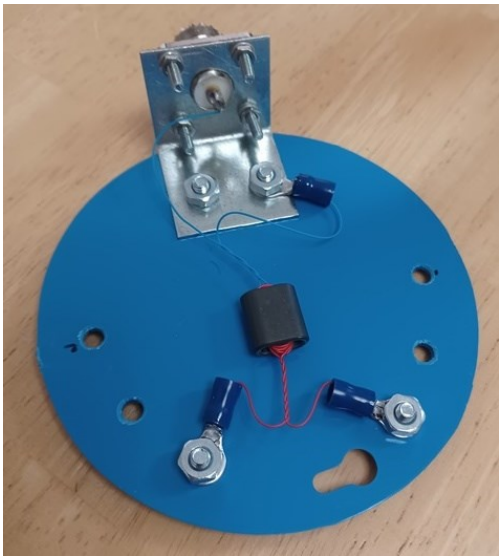
## *160-meter pennant antenna*

Solder #8 ring terminals to both red transformer wires, and another to one of the blue wires. Solder the remaining blue wire to the solder cup of the SO-239 bulkhead connector. Attach the binocular transformer to the plastic piece with a dab of hot glue. Attach the ring terminals of the red wires to the #8 screws on the plastic piece, and the ring terminal of the blue wire to one of the #8 screws holding the strap to the plastic piece.



Here's a diagram of what we're trying to accomplish, by the way (the SV-PEN is a DX Engineering product):



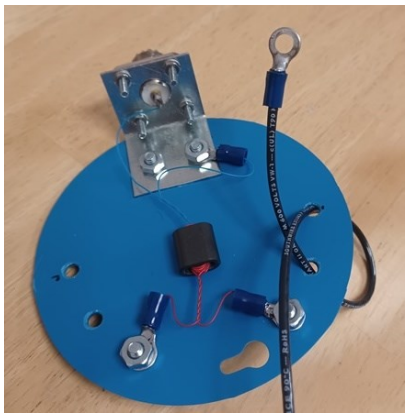



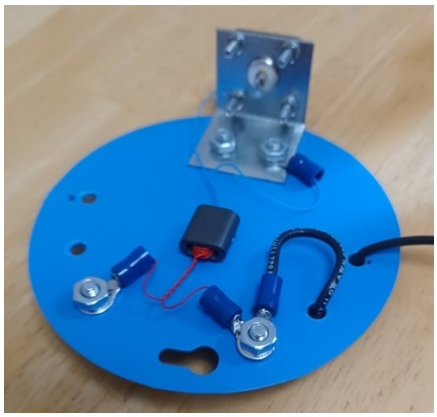
# DIY, continued

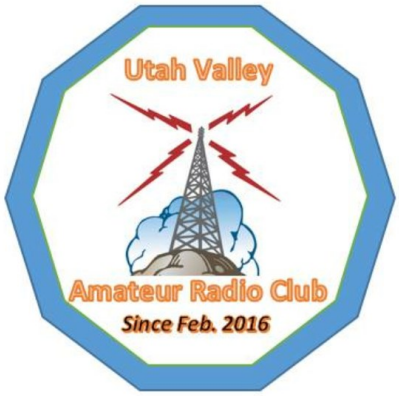
## *160-meter pennant antenna*

### Assemble the wire elements

Cut two (exactly) 37-foot 0-inch pieces of 14 AWG wire for the elements. Thread one of the element wires through one of the two drilled holes in the first plastic piece farthest from the #8 screw, then through the second hole. Solder a #8 ring terminal to the wire, then attach the ring terminal to the #8 screw and secure it. Repeat this for the other element. Attach the other ends of the element wires to the second plastic piece in the same manner.





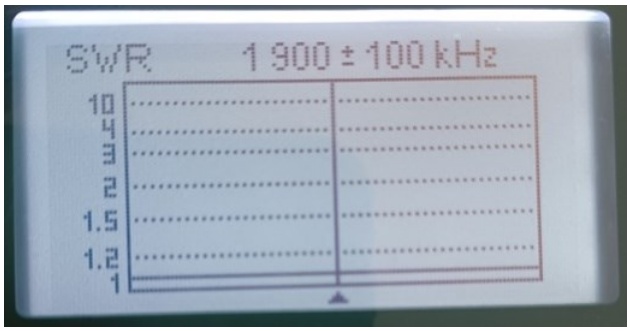



# DIY, continued

## *160-meter pennant antenna*

### Testing the pennant

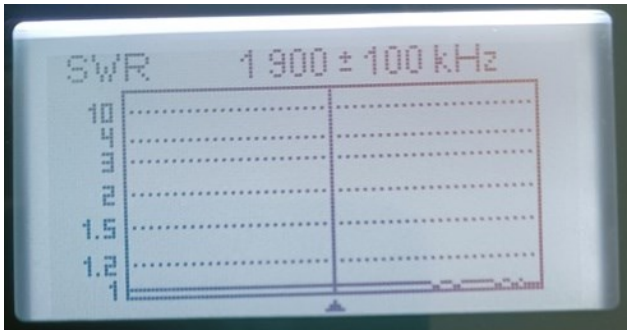
Admittedly, the pennant antenna is a bit of a chore to install, because it needs to maintain its "pennant flag" shape well above ground level, and clear of anything metal. Once it was in place, I applied the analyzer, and got a surprising result:




When somebody shows me an analyzer result like this, experience tells me right away that something is probably wrong. A low SWR across the band is terrific, but *completely flat*? Honestly, if it's too good to be true, it's likely a false positive.

So, I decided to re-calibrate my analyzer, then hook it up (using the same coax, to eliminate that possible failure point) to a 100-ohm test load. If all goes well, the analyzer is expected to read 100 ohms ÷ 50 ohms = 2.0:1 SWR across the band. To the right is the result from my analyzer following the re-calibration:

As you can see, the analyzer reads as expected, with a nearly flat line across the band right at 2.0:1 SWR. Perfect. Now, armed with a re-calibrated analyzer, I connected it to the pennant antenna again, and got this result:




I couldn't believe my eyes. The new reading was actually *slightly better* than the first, with the SWR improving toward the higher end of the band. In all my years, I have never built an antenna with an SWR this low across the entire band. And on the first try...I never needed to modify or tune the antenna even the slightest.

To be honest, I have not yet tried this antenna on the air, so I really won't know if it actually works until I do. Still, it looks promising.

### Summary

The 160-meter pennant is a balanced, ungrounded antenna that was originally designed as a receiving antenna. But, with some re-designing using a termination resistor and a 4:1 isolation transformer, we can turn it into a transmitting antenna that exhibits surprisingly low SWR across the band. It was easy to build, but a little difficult to erect, but analyzed like a charm. The jury's still out on it until I can actually use it on the air, so stay tuned.

*Noji Ratzlaff, KNØJI (kn0ji@arrl.net)*

# Living in the Past

***Historical perspective***

## Crushing the gender stereotype

Born in 1880, Mary Texanna Loomis was quite the prodigy child, brought up in a middle-class American family. She mastered German, Italian, and French, then became interested in wireless telegraphy. Mary spent quite a lot of time learning the wireless art, being inspired by her cousin Mahlon Loomis, who made the first wireless transmission in 1865.

In the early stages of World War I, Mary wanted to "do something useful for my country," and became fascinated with wireless communication. Not only did she learn, but mastered telegraphy, enough to earn a First Class Telegrapher License, call sign 3YA. In 1920, once the war was over, Mary wanted to continue her pursuit of what came to be called *radio*, and spent nearly every penny to open a Washington, D,C., radio school in honor of her cousin, whom she felt was not given the historical credit he was due. She called it the Loomis Radio School, the first one to be founded and run by a woman, and the first successful civilian radio school ever.

### Her textbook

While running and teaching at her radio school, Mary singlehandedly wrote and published a 1000-page radio textbook, *Radio Theory and Operating* in 1930. It became the *de facto* radio operation textbook in the US, to be found in university classrooms and libraries across the nation, and many radio schools around the world. The textbook would probably have given today's *ARRL Handbook* a run for its money.

Mary designed and constructed nearly every piece of transmitting, receiving, filtering, aerial, and other radio equipment in the school. *How would I know, or how could I teach, the practical side of radio unless I knew all about the apparatus, both inside and outside? Nobody can graduate from my school until he learns how to make any part of the apparatus. I want my graduates to be able to meet any emergency or mishap that may arise some day.*

Since that day, many hundreds of broadcast radio announcers and amateurs have credited her school with their radio education. Mary passed away in 1960, and no records remain that explain what eventually happened to her school, but her legacy has been preserved by numerous benefactors.

# Side of Bacon

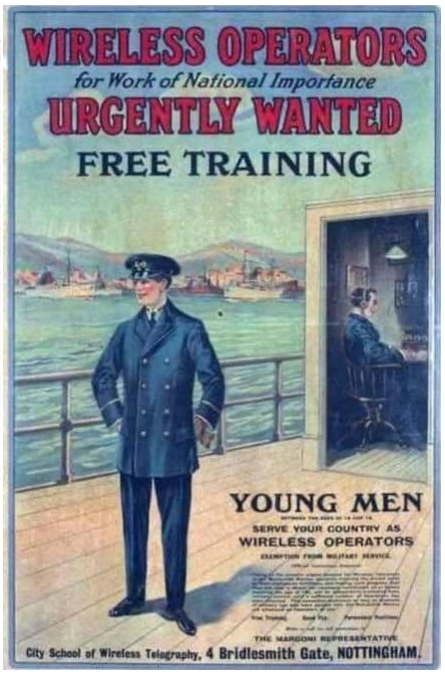
*A little ham humor*

Utah Valley Amateur Radio Club
Since Feb. 2016

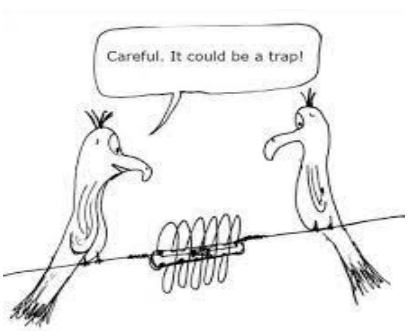
**MESSAGES GOT THROUGH ON THE "BANANA NET"**

THERE is many an exciting story about how amateur radio operators now in the services have helped extend the lines of victory around the world. There's the one about the "Banana Net"—the name the boys gave to the radio network down in the Panama jungle. As the G. I.'s have it, "it rains continually during the rainy season but only once a day in the dry season". The "Banana Net" is just one link in the vast network set up by the AACS—Army Airways Communications System. The AACS safeguards tens of thousands of lives by relaying weather reports, coordinating information on enemy ship and plane movements and by bringing home or locating flying ships that are down or in trouble.

The ranks of the far-flung AACS are filled with one-time amateur radio operators. Amateurs have always found in Hallicrafters equipment the perfection they themselves have been seeking. For these exacting technicians Hallicrafters made superior equipment long before the war. As a matter of fact thousands of pieces of privately owned Hallicrafters equipment were drafted into the services right along with the amateurs who once operated them. After the war Hallicrafters will have a new kind of radio ready. You will want the radio man's radio—the radio that has an amazing range and performance on all bands, short wave and regular broadcast. There will be a set for you in our post-war line.



This is Hallicrafters new Model SX-28A, latest version of the famous Super Skyrider. It is a 15-tube communications receiver operating on a frequency range of 500 kc to 42 Mc, continuous in 6 bands including the regular broadcast band.
BUY A WAR BOND TODAY!
hallicrafters RADIO



"You're ringing the doorbell."

# For Your Insight

***Information you could use***

## Club meeting format

Here's the usual agenda for club meetings, at the Orem City Council Chamber Room, 56 N State St:

Talk-in frequency on the club repeaters

**6:30 pm** : Eyeball QSO

socialize / put faces with call signs

radio programmers available to help you

**6:45 pm** : Call the meeting to order

meeting lineup (agenda)

announcements / nets / awards / calendar

**7:00 pm** : Discussion / breakout session

*discussions* typically involve everybody

*breakouts* split into separate groups

**7:45 pm** : Door prizes

**7:55 pm** : Dismiss and disassemble

**8:00 pm** : *Club QSY* to a local eatery

*Something you'd like to see at the meetings?*

## Monthly meeting help

We're grateful for the volunteers who help with various tasks that make our club night just that much more friendly and useful to everybody. Monthly, we need help with

programming radios (thanks, Loren / Ralph!)

taking photos or videos during the meeting (thanks, Joe!)

operating the talk-in radio

setting up tables and chairs (thanks, Heath!)

## Lynx

Websites for your education and leisure

Ham radio equipment

Ham Radio Nets

Radio programming

76ers Group and UVARC Group pages

Utah Ham Radio Exam Schedule

*Send your input to* ***uvarcshack@gmail.com***

# Test your knowledge

*General and Extra review (answers next page)*

**G5C14** : Which of the following components should be added to an inductor to increase the inductance?

A. A capacitor in series
B. A resistor in parallel
C. An inductor in parallel
D. An inductor in series

**E3AØ6** : What might help to restore contact when DX signals become too weak to copy across an entire HF band a few hours after sunset?

A. Switch to a higher frequency HF band
B. Switch to a lower frequency HF band
C. Wait 90 minutes or so for the signal degradation to pass
D. Wait 24 hours before attempting another communication on the band

# Calendar

***What's happening***
***(times are Mountain Time)***

## Utah County Ham Exam Sessions

*BYU J. Reuben Clark Law School building*

*Sign up at HamStudy.org/sessions*

Sat Jun 11, 2:30 to 5:00 pm
Wed Jun 15, 7:00 to 8:30 pm
Wed Jul 20, 7:00 to 8:30 pm
Wed Aug 17, 7:00 to 8:30 pm
Sat Sep 17, 2:30 to 5:00 pm
Wed Sep 21, 7:00 to 8:30 pm

## Provo One-day Technician Courses*

Third Saturday Monthly at 8:00 am
BYU Law School Bldg, First Floor
* *September through April*

## 2022 Orem Ham Radio Courses

*Sign up at psclass.orem.org*

Technician : Canceled
Extra : Tue Jul 12, 19, 26, Aug 2, 9
Technician : Tue Sep 20, 27, Oct 4, 11

## Club Meeting Calendar (6:30 pm)

*On YouTube Live, and Facebook Live*

| | |
|---|---|
| June 2 | July 14[@] |
| August 4 | September 1 |
| October 6 | November 3* |
| December 1* | January 5 |

[@] *Ham Radio Fair, Lindon Community Center*

* *At the Orem Friendship Center*

## Regular Nets

**UVARC Ladies' Net**, Tue 7 pm, 146.780
**DMR Utah Net**, Wed 6 pm, TG 3149, CC 1
**Utah 76'ers**, Wed 7 pm, 146.760
**UVARC HF Net**, Wed 9 pm, 28.345 / 7.220
**UVARC New Ham Net**, Thu 7 pm, 146.780
**CERT Ham Net**, 2nd, 4th Thu 8:pm, 146.780
**UVARC 2-meter SSB Net**, Thu 9 pm, 144.234
**Utah County 6-meter Net**, Fri 8 pm, 50.140
**Family History Net**, Sat 8 pm, 146.780
**UVARC Family Net**, Sun 3:30 pm, 146.780
See a larger list of nets at noji.com/nets

## Upcoming Contests

***ARRL International Digital Contest***
Noon Sat Jun 4 to 6 pm Sun Jun 5

***ARRL Kids Day***
Noon to 6 pm Sat Jun 18

***ARRL Field Day***
Noon Sat Jun 25 to noon Sun Jul 26

***IARU HF World Championship***
6 am Sat Jul 09 to 6 am Sun Jul 10

See a larger list at contestcalendar.com

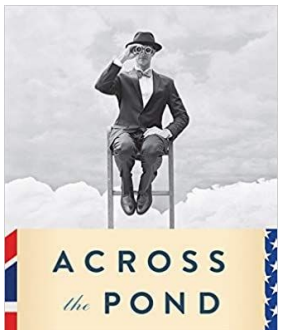
# Answers to *Test your knowledge*

**G5C14** : **D** ( An inductor in series )

**E3AØ6** : **B** ( Switch to a lower frequency HF band )

# Across the Pond

***That is, the Utah Lake 'pond'***




## Eagle Mountain ham radio activities

This is a list of amateur radio activities that are organized near Eagle Mountain, primarily by Dave Becar KI6OSS. Unless otherwise noted, all these activities will be held at the Eagle Mountain City Hall, 1650 Stagecoach Run. Please contact Dave at **dbecar@charter.net** to register for any of the classes or exams, for any additional information, or with questions in general.

### Ham Radio Exam Session

Sat 02 July, 10 am
Sat 24 September, 9 am to noon
*Open to all, for any license class*

### September 2022 Technician Course

Thu 01 September, 7 to 9 pm
Wed 14 September, 7 to 9 pm
Thu 22 September, 7 to 9 pm
Thu 29 September, 7 to 9 pm
Thu 06 October, 7 to 9 pm

### Special Ham Radio Exam Session

Sat 24 September, 9 am to noon
*Held at the UVARC Swap Meet in Spanish Fork*

### Hands-on Class

Thu 03 November, 7 to 8 pm

### Ham Radio Nets

**Eagle Mountain ECT Net**
Sundays, 9 pm 145.230- MHz (131.8 Hz)

**Eagle Mountain Chimney Rock Stake**
Sundays 8:30 pm 446.500 (s)

**Eagle Mountain Central Stake**
Saturday 8 pm 145.650 (s)

# Vendors

## *For your convenience*

**Pockrus Joystick J-pole**

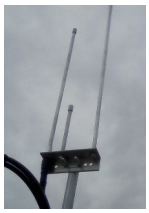
$30, open-stub aluminum half-wave, dual-band J-pole antenna

$40, 6-meter dipole, $20 for the 220 MHz (1.25 m) antenna

by Carl Pockrus, WE7OMG (email omgantennas@gmail.com to order)

Half-wave performance, solid construction, weather-proof, low wind-load

*Probably the best-performing outdoor antenna you can get for the price*



**Super-Elastic Signal Stick**

$20, vertical quarter-wave flexible antenna

by Richard Bateman, KD7BBC, of *SignalStuff* (and maker of *HamStudy*)

Super-performing antenna for your HT (handhold transceiver)

Visit SignalStuff and select SMA-Male, SMA-Female, or BNC

**Ham Radio Podcasts v1.50**

by Trevor Holyoak, AG7GX (email android@holyoak.com)

Stream podcasts (such as *100 Watts and a Wire*, *Amateur Radio Newsline*, *ARRL Audio News*, etc.) or download for later listening

For Android 4.1 and up (ad-free available for purchase)

**Club Logo and Call Sign Embroidering**

Want your call sign or name (or both!) embroidered on your shirt, your hoodie, your duffle? Or how about a club patch with your call sign?

by Glenna Gardner, WE7SEW (glenna0354@gmail.com or text 801-592-2503)

Call sign or name = $5, Both = $8, UVARC patch = $5, Patch with call = $9

**Portable Aluminum J-pole**

$60, sectioned, open-stub aluminum half-wave, dual-band J-pole antenna

by Stan, KJ7BDV and Kent, N7EKF (email skantenna@yahoo.com for info or call 801-372-7260)

Complete antenna breaks down into a compact 2″ x 6″ x 12″ package weighing only 3 lbs, perfect for backpacking and portable work where you really need a good 2-meter antenna

**HamBadgers**

Amateur radio name badges and other products

$10, official UVARC ham radio name badge with the club logo

Visit Ham Badgers and select Ham Radio Clubs > Utah Valley Amateur Radio Club

Email Eric Palmatier at hambadgers@gmail.com or call 919-249-8704

Where everybody knows your call sign

*Utah Valley Amateur Radio Club*
PO Box 1288

K7UVA
Phone/Text: 801-38-1865
Email: k7uva@arrl.net

Repeaters: 146.780–, 100.0
448.200–, 100.0 224.560–, 100.0
145.250-, 100.0  448.225-, 100.0
Newsletter input?
Email uvarcshack@gmail.com
Need help?
Email uvarcelmer@gmail.com

[ See all our newsletters on uvarc.club ]

We are the *Utah Valley Amateur Radio Club*, a 501(c)(3) non-profit (EIN 81-360-6416) Utah corporation that was organized in an obscure Orem fire station on 02-05-2016 to provide amateur radio enthusiasts in Utah County and surrounding areas a way to gather and discuss all things ham. Our primary purposes are to provide a local amateur radio resource, help new hams in their new-found adventures, and to give more experienced hams a reason to share their wealth of knowledge and wisdom in a friendly atmosphere of fellowship.  We're an ARRL Affiliate and work in cooperation with the Utah VHF Society, but are not subsidiary to them, to ARRL, ARES, or any other organization, although many of our members and leaders might also belong to the same.

This newsletter is copyrighted and published by the Utah Valley Amateur Radio Club, and its purpose is to convey the tone and temperament of the club, to inform and entertain its members, and to entice the rest. To join, go to uvarc.club/join, then sign up at www.facebook.com/groups/uvarc/ to stay informed. For more information about our club or about amateur (ham) radio in general, please email or text or call us.

*More than just a club, we invite you to become part of a great ham radio movement in Utah Valley*

## Our fearless leadership

### Presidency

President..... Noji Ratzlaff
Vice President..... Chad Buttars
Secretary.....Caryn Alarcon
Activities..... Wendy Shoop
Technology.....Trevor Holyoak

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Aubrey Mikkelsen, K7GUM
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Brad Kirk, AF7FP
Alma Perry, W1ZGY
Loren Chandler, WB1KE
James Brown, W7JHB
Harry English, AA1HE

### Club Sponsor

Heath Stevenson
Orem City Emergency Manager

From all of us to you, 73

*Caryn KG7UUR, at the helm*

*Craig N1HI, gets the ARRL membership*

*Kathi K7UAM*